

Using Existing Smart Meters for Improved PSPS Resiliency

Interconnection Discussion Forum

December 16, 2019

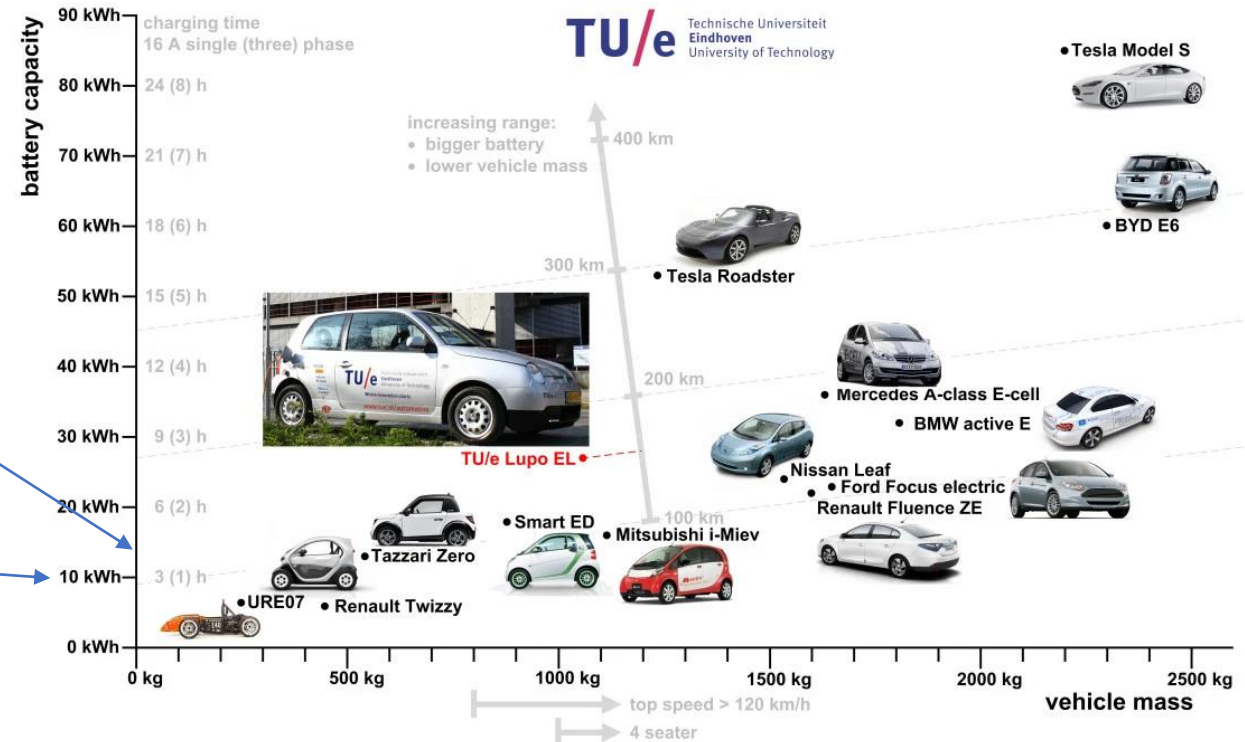


EVs as a DER and/or Resiliency Resource

- Vehicle-to-home (V2H) and vehicle-to-building (V2B) is a high-potential resource for resiliency to allow for discharge when disconnected from grid
- Various interconnection barriers exist and are being worked through but this proposal does not require resolution in Rule 21 at this time



LG Chem



About 33 North Energy / Josh Gerber

- Former employee of San Diego Gas & Electric
 - Active in grid technology solutions since 2005
 - Smart Grid Architect 2009 – 2012
 - Manager, Advanced Technology 2012 – 2017
 - Leader of SDG&E's energy storage response to the Aliso Canyon emergency
- Since 2017, independent consultant
- Long time collaborator with California Energy Storage Alliance (CESA)



Public Safety Power Shutoffs

CALIFORNIA WILDFIRES

During blackouts, PG&E microgrids kept lights on — for a few lucky places

J.D. Morris and Carolyn Said | Nov. 24, 2019 | Updated: Nov. 24, 2019 12:36 p.m.



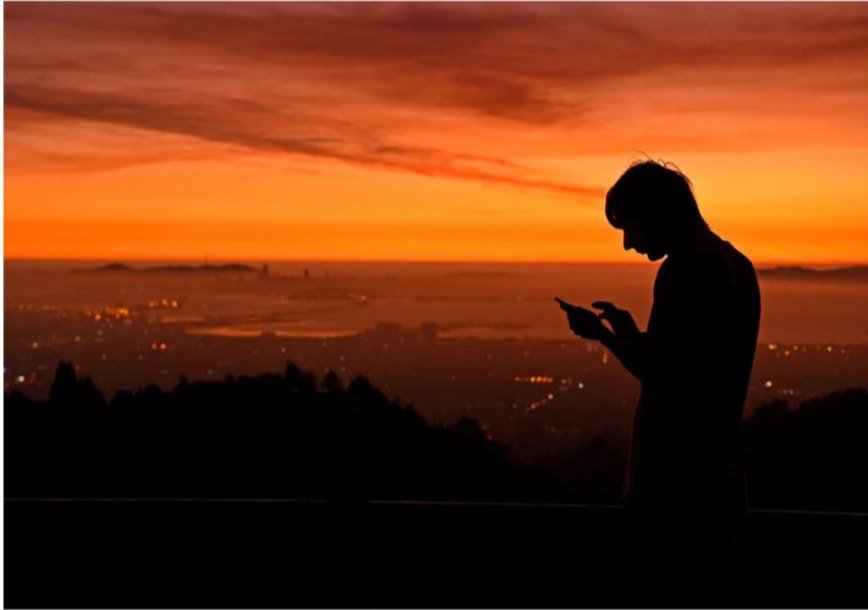
1 of 7

PG&E generators provide Calistoga with backup power for central, essential services during fire-prevention shut-offs.

Photo: Talia Herman / Special to The Chronicle

- Millions of customers impacted
- Increasing deployment of technology mitigates some effects
- Temporary diesel-powered microgrids (see image) impact emissions, noise and can be deployed in limited locations
- More DERs NOW can help, but
 - IOU interconnection rules require certification / listing to UL
 - Limits the options for affected customers
- Limits capability of utility to fulfill compact with customers: Safe, reliable, efficient, secure, sustainable energy delivery

California Blackouts Hit Cellphone Service, Fraying a Lifeline



Smoke lingered over the San Francisco skyline as a cellphone owner checked his device in Oakland. Cellular service was subject to outages as power was cut to reduce the wildfire risk. Jose Carlos Fajardo/Bay Area News Group, via Associated Press

PSPS effects

In late October, Direct Relief surveyed nearly 300 community health centers in California about how they were affected by the power shut-downs. Of the 31 that responded, nearly two in five (39%) said they had lost power during the grid shut-offs, and 29% were forced to close during the outages.

<https://www.directrelief.org/2019/11/unplugged-how-californias-power-outage-disrupted-patient-care-on-californias-northern-coast/>

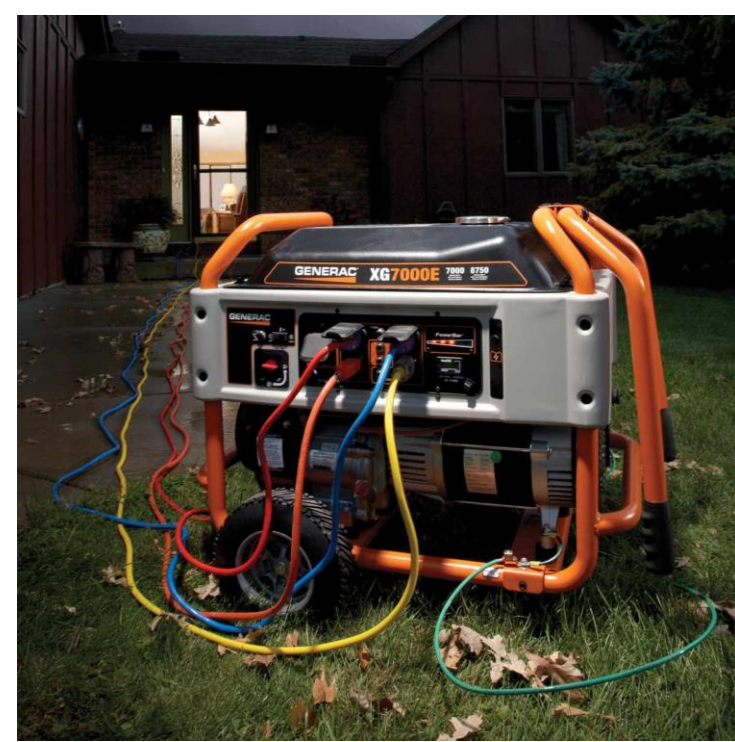
Telecoms, Internet Firms Explain Why PG&E Shutoffs Knocked Out Service

Companies said most sites have batteries or generators, and some even have both, but they could last anywhere from two hours to a week. And many said it was logistically impossible or unsafe to deploy or refuel gas generators.

NOV 20 / BY TRIBUNE NEWS SERVICE

Getting backup power for all communications services is "infeasible" or "impossible" during extended power outages, according to filings that providers made with California regulators.

- Cellular base station sites are often equipped with backup power, but commonly with maximum of 24-48 hours of battery backup or onsite fuel
- Medically vulnerable and lower income Californians unable to evacuate during PSPS may be disproportionately affected



ency generator sparked a fire that burned the garage of his Grass Valley home during a PG&E power shut off in late September.
Iacor / Special to the Chronicle

During PG&E outages, generators caused fires, carbon monoxide poisoning

Mallory Moench | Nov 14, 2019 | Updated: Nov 15, 2019 11:08 a.m.



1 of 4

Art Bern Jr. looks at damage at his parents' Nevada County home where an emergency generator sparked a garage fire during a PG&E power shut off in late September.

<https://www.npr.org/2019/11/08/777752175/with-blackouts-californias-electric-car-owners-are-finding-new-ways-to-charge-up>



What Californians are doing now during PSPS – less safe or less clean sources

- Connecting AC inverters to the 12V batteries in their electric or gas/diesel fueled vehicles and running extension cords
- Running gasoline generators with multiple extension cords (or worse, plugged into one or more outlets!)
- Using manual or automatic generator transfer switches connected to critical circuit subpanel
- Pursuing utility interconnection agreement (Rule 21) to operate grid-tied PV / battery with island-capable inverter (most costly, often \$12,000 - \$20,000+)
- Who knows what else?

Safe[r] options available today for limited backup power during PSPS



Backup Power Option		Relative Cost
Home/Small business solar, battery storage, grid-tied, island-capable inverter	Pro: Clean . Silent. Reliable. Built-in communications and automation. Con: Expensive. Limited battery storage (typically 7-10kWh blocks). Requires compliance to IOUs' Rule 21 and related technical standards for interconnection agreement (typically UL 1741 certification & listing).	\$\$\$\$\$
Backup generator connection – automatic or manual transfer switch	Pro: Available now. Con: Fossil fueled . Typically require rewiring of breaker panel to subpanel for critical circuits.	\$\$\$ - \$\$\$\$
Backup generator connection – generator breaker interlock	Pro: Relatively inexpensive, simple. Con: Typically not UL listed. Weaker safety mechanism.	\$\$
Meter socket mounted whole house automatic transfer system	Pro: Lowest installation costs. Enables use of EVs and clean power sources for temporary backup power with standard interfaces and monitoring capabilities. Con: Not currently allowed by CA IOUs.	\$

Temporary Service Disconnections for PSPS Resiliency

- Temporary disconnection of service at the meter prior to PSPS de-energization (provides 1st level of protection and meets §119075(b) using the existing service disconnect breaker built into most CA IOUs' smart meters)
- Still requires a transfer system for §119075(c) compliance if permanent installation
- A smart meter integrated, meter socket mounted transfer system allows utility to safely control the islanding and reconnection processes, monitor & collect data on DG during PSPS
- This is intended to provide partial/whole backup power during emergency PSPS de-energizations only, not to enable at-will “grid defection”
- Intentional islanding via service disconnection allows customer to form their own low[er] cost microgrid during emergencies using on site storage, generation, V2H, etc. equipment that never connects to the distribution grid; the utility controls backfeed protection
- Because it never runs in parallel with the grid, the equipment does not require utility interconnection and does not have to meet technical standards such as UL 1741 listing, or smart inverter standards, reducing significant customer cost

How the system could work

Step	Utility	Participating & Impacted Customer	Benefits
1	Makes decision for PSPS. Notifies impacted customers.	Receives notification, prepares for PSPS. Charges EV, other clean power source.	Follows the same utility plans & practices used today.
2	Prior to PSPS de-energization, utility temporarily disconnects service to customer.	No extra action required. Adds some [minimal] time to the customer's PSPS outage.	Uses existing service disconnection process and smart meter disconnect. Grid electrically protected from backup power source.
3	Performs typical PSPS de-energization.	Connects backup power source[s], as available. System automatically transfers to the backup power source.	Multiple use clean power sources like an EV can be used for emergency backup.
4	Can collect data or monitor islanded customer during PSPS.	Rides through PSPS with one or more backup power sources.	Customer has limited power / energy during PSPS.
5	Re-energizes distribution system. Notifies customers.	Remains islanded. Disconnects backup power source so transfer system can automatically return to utility service.	Utility can safely re-energize while reducing backfeed risk.
6	After confirming customer DG is disconnected, reconnect service at meter.	After disconnecting backup power source, no further action is required.	Utility controls reconnection process, maximizing safety and reliability during PSPS.

What's in it for ...

- The IOUs:
 - Leverages existing ratepayer investments in people, process and technology
 - Enables IOUs to serve some customers with safe, reliable electric service during PSPS – often from safer, more efficient, and cleaner sources than might otherwise be used
 - Improved safety: utility controls service disconnect & process, so they can ensure separation from the distribution grid and no generator backfeeds
 - Can add value by informing customer of issues with DG, based on data
 - Enables innovation in backup power supplies, transfer switches, breaker panels, etc.
- Customers:
 - Enables industry to innovate new technologies to safely connect clean, silent backup power sources (like EVs) during PSPS, providing customers with safe, lower cost backup solutions
 - Marginally increases PSPS service restoration times

Challenges

- Requires multi-department changes within IOUs
- Requires IOUs to have sufficient lead time between a final PSPS decision and de-energization to reliably disconnect service
 - Customers won't want to switch to backup power unless de-energization is certain, and don't want to switch too early
 - Target should be minutes prior to section / circuit de-energization (not hours)
 - Smart meter head end processing and communications latency must be considered and tested
- Limited financial incentive for IOUs to enable

Next Steps

- **The CPUC can support proof of concept of this proposal to have clean temporary power sources for PSPS resiliency through a pilot to be conducted over the next several months:**
 - Establish the creation of a memorandum account to allow each of the utilities to recover the costs of funding this pilot in the next general rate case (transfer switches, engineering, administration)
 - Define the scope and objectives of a limited pilot for some number of participants (including only mobile inverters with grid-forming controls) to demonstrate concept proposal through simulated PSPS events
- **With pilot results by July 2020, we can assess and seek potential solutions to implement this on wider scale:**
 - Standardized process for customers to subscribe and apply to this type of temporary disconnection process for PSPS resiliency and operating procedures
 - (Funding to support transfer switches to be deployed and installed (source of funding TBD))

Thank you

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California Energy Storage Alliance

storagealliance.org

